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from railroad connection, and in consequence are devoted entirely to agricultural pursuits. The population increased in the past decade 16.1 per cent. From a careful field survey of this region I am convinced that the large increase is due to the prevalence of large families. The small family is in that region the exception.

The Valley has had a normal healthful growth, with an increase of 13.5 per cent. This is the most productive agricultural region of the State. It has for many years been served by a railroad line throughout its length. The productivity of the soil, proximity to shipping points and small towns, and a native population trained to labour with the hands have minimized the tendency toward urban migration.

Appalachia has been the scene of the most phenomenal development, chiefly through the growth of the coal and iron industries. The average increase in population 1890-1900 was 29.9 per cent., and the increase since 1900 has been even greater. Wise County showed an increase of 110.3 per cent.; Allegheny, 75.9 per cent.; Buchanan, 65.2 per cent.; and Dickenson, 52.6 per cent.

* * * * *

Of the total population engaged in some gainful occupation (536,883), 45.4 per cent. are engaged in agriculture, as compared with 51.5 per cent. in 1880; 15 per cent. in domestic and personal service; 14.1 per cent. in manufactures and mechanical pursuits; 11.2 per cent. in trade and transportation (as compared with 6.4 per cent. in 1880); 2.5 per cent. in professional service; 1.4 per cent. in fishing; 1.1 per cent. in mining and quarrying; and the remaining 9.4 per cent. in sundry vocations.

GEOGRAPHICAL RECORD.

AFRICA.

SUICIDE AMONG BARBAROUS PEOPLES.—In his book "The Lower Niger and its Tribes," Mr. Arthur Glyn Leonard says that in the Brass district of the Lower Niger there are many cases of suicide. One of the commonest methods is to hold the breath, which is done with so much determination as invariably to result in death. While this form of death is regarded by some of the most intelligent chiefs as deliberate self-murder, it is undoubtedly the result of mental derangement due to the impression that the person is afflicted by malign influences. Other methods of suicide are employed in this region. A canoe builder exiled from Brass for some reason, who earned a good living at his trade, was always unhappy because he was not permitted to return to his home, and finally he shot

himself. Owing to able medical treatment his life was saved. He said that as he could not get back to his people, he had no wish to live, and, moreover, the tree spirits living in the bush where he made his canoes were hostile to him and he feared they would take his life.

Among the Ijo people, suicide of the violent kind is very common. A labourer working for the Niger Company, simply because his wife had upbraided him in the morning, promptly drank two bottles of gin and then hanged himself from a beam. Another Ijo native, who had formed an attachment with a certain woman, shot her when she refused to return with him to his own country and then put an end to his life. The sensitive and phenomenally impulsive nature of these simple people is illustrated in the case of an Efik youth, a slave of one of the big chiefs, who quietly retired into the bush and killed himself because he had been accused of theft from one of the factories. The majority of Ijo natives condemn suicide as a piece of folly, and it is generally spoken of as a devilish or evil death.

FROM VICTORIA NYANZA TO KILIMANJARO.—Captain G. B. Smith describes in the March number of the *Geographical Journal* the journey between Victoria Lake and Mount Kilimanjaro which he made in 1904, as Commander of the British section of the Anglo-German Boundary Commission. His map across this little-known country will be printed later by the Royal Geographical Society. Detailed mapping was required along the boundary and, when favourable opportunities occurred, was also carried out elsewhere. The determination of the level of Victoria Nyanza is 3,737 feet, which does not differ greatly from that of the railway survey, 3,726 feet. The geographical results included triangulation without break from Zanzibar to Kisumu, the terminus of the Uganda railroad on Victoria Nyanza, and this long series of triangles is connected with Lieut.-Col. Delme-Radcliffe's chain from Kisumu to the intersection of the Anglo-German and Anglo-Congo boundaries west of Victoria Nyanza. In the discussion of Captain Smith's paper, Major Close referred to the great succession of elaborate surveys every year that are gradually reducing Africa to a region as well known as the United Kingdom: "There is hardly a town in Africa that we do not know the position of within about ten miles—in fact, most towns we know within two or three miles."

Major Villiers said that in British East Africa they are beginning to raise Australian sheep, and there is no doubt that on the high plateau of that Protectorate sheep will thrive well.

THE ALEXANDER-GOSLING EXPEDITION TO AFRICA.—*Nature* reports that Lieut. Boyd Alexander, who, with his brother, Captain Claud Alexander, Captain G. B. Gosling, Mr. P. A. Talbot, surveyor, and a Portuguese collector, left England in the spring of 1904 on an exploring expedition across Africa, has returned to London. Captain Claud Alexander died at Naifoni in November, 1904, and Captain Gosling in the Ubangi-Welle region in June, 1906. Much valuable work was accomplished. A careful triangulation was carried out from Ibi in Nigeria, to Lake Chad, and the lake itself was traversed in various directions. Part of the course of the Shari was explored; from thence the Ubangi was reached and the expedition made its way northward to the little-known region where many of the Bahr-el-Ghazal tributaries rise, and then proceeded down the Yei to the Nile. The expedition was particularly successful in collecting specimens in natural history, including skulls, bones, and skins of the okapi.

CHANGES OF CLIMATE IN AFRICA.—A good many reports have been brought back from Central Africa by various explorers and travellers during recent years to the effect that the lakes in that region are drying up. These reports have given rise to the belief that permanent progressive changes in climate are now taking place in Africa. Critical investigation is always necessary in such matters, before any definite conclusions are reached, and thus far climatologists have not been satisfied that there is any evidence of unquestioned reliability which necessarily leads to a belief in progressive climatic changes within historic times. The reports from little-known regions are very often contradictory, and when carefully matched do not lead to any definite result. Regarding the African lakes, Major A. St. H. Gibbons points out, in a recent article on "The Transition of British Africa" (*Scot. Geogr. Mag.*, March, 1907), that there are evidences of a down-cutting of the lake outlets which would result in a draining of the lakes, and thus give the appearance of progressive desiccation. Speaking of the lakes of equatorial Africa, Major Gibbons says that "three at least are victims of the same gradual erosive action which in centuries gone by deprived the Zambezi of its great lakes." Lake Mweru must, he believes, have had at least four times its present area before the outlet had begun to erode the rocks at the base of the valley through which it now flows. The Lukugu outlet of Tanganyika passes over a sand bar, and Major Gibbons believes that the same lowering process will continue there until bed-rock is reached. Tanganyika gives evidence of annual lowering of 10 inches. Much has been written of the lowering of Lake Ngami. Major Gibbons reports that this body of water shows signs of refilling in the last few years.

All this shows the need of the greatest caution in interpreting the facts which lead to a belief in climatic changes.

R. DEC. W.

AMERICA.

THE INLAND WATERWAYS COMMISSION.—A Commission with this title has been appointed by President Roosevelt. Its members are: Hon. Theo. E. Burton, chairman; Senator Francis G. Newlands, Senator William Warner, Hon. John H. Bankhead, General Alexander Mackenzie, Dr. W. J. McGee, Mr. F. H. Newell, Mr. Gifford Pinchot, Hon. Herbert Knox Smith.

In his letter to the Commission, the President says that the time has come for merging local projects and uses of the inland waters in a comprehensive plan designated for the benefit of the entire country. The railroads are no longer able to move crops and manufactures rapidly enough to secure the prompt transaction of the nation's business. The products of the northern interior States have doubled in ten years, while the railroad facilities have increased but one-eighth. There is small prospect of immediate relief and no development of the railroads in the near future is possible which will keep transportation abreast of production.

There appears to be but one remedy—the development of a complementary system of transportation by water. Our streams should be considered and conserved as great natural resources. The Commission is asked to take the whole subject into consideration:

Any plan for utilizing our inland waterways should consider floods and their control by forests and other means; the protection of bottomlands from injury by overflows and uplands from loss by soil-wash; the physics of sediment-charged waters and the physical or other ways of purifying them; the construction of dams and locks, not only to facilitate navigation, but to control the character and movement of the waters; and should look to the full use and control of our running waters and the complete artificialization of our waterways for the benefit of our people as a whole.

The President's letter adds that the reports of the Commission should include both a general statement of the problem and recommendations as to the manner and means of attacking it.

WESTERN COAL FIELDS.—The U. S. Geological Survey has paid much attention during the past season to coal in the western States. These fields are extensive, but, as yet, are little developed, and some of them are only slightly known. Bulletin 297 prints the final report which Mr. H. S. Gale and his party made of the Yampa field in northwestern Colorado. Last summer, Mr. Gale carried a topographic and geologic survey over an area of 1,000 square miles extending south from the Yampa field through parts of Rio Blanco and Garfield counties, in what are known as the White River and Grand River coal fields. *Economic Geology* (1907, No. 2,) says there are many thick coal beds throughout this area, mostly bituminous coal, which will make excellent steam and domestic fuel. Mr. Gale has in hand a considerable amount of information concerning coal areas in Colorado, which promise to provide fuel for that State for hundreds of years and have some to spare for less fortunate neighbours.

DRAINING THE EVERGLADES.—The United States are confronted by the problem of removing water from lands which suffer from a surplus, as well as by the problem of bringing water to land suffering from a deficiency. The Florida Everglades form a swampy plain extending from the south shore of Lake Okeechobee to the southern boundary of the State. They have an area of 5,000 square miles covered with saw grass of extraordinary height, relieved by scattered hillocks on which grow pine and palmetto trees, and various subtropical bushes.

The entire plain is covered with water to various depths throughout the year. The water is derived in part from an annual rainfall of 60 inches and in part from the overflow of Lake Okeechobee. The lake receives the drainage of an area of 5,000 square miles in the northern part of the State. As the only regular outlet is the small channel of the Caloosahatchee River, which discharges westerly into the Gulf of Mexico, the lake often spills over into the Everglades.

It seems probable that by enlarging the channel of the Caloosahatchee and by constructing canals, the water can be drawn from a large part of the Everglades. It is also probable that the muck on which the water now stands will prove highly fertile when it is rendered comparatively dry and has had an opportunity to become aerated. Both these propositions have been violently, almost bitterly, opposed. In order to ascertain the actual facts in the case the U. S. Department of Agriculture, through the Bureau of Irrigation and Drainage Investigations of the Office of Experiment Stations, has made the matter a subject of special study. Under the charge of Mr. John T. Stewart, a line of levels is being run across the peninsula of Florida from Fort Myers on the west to an undesignated point on the east. The relation of the level of the surface and bottom of the water of the northern part of the Everglades to the level of Lake Okeechobee and to tidewater will be ascertained; and the character and depth of the muck overlying the supposed rock floor of the region will be carefully studied. If the drainage of the Everglades proves possible and if the soil is as fertile as there is reason to expect, the habitable portion of the United States will be increased by an area as large as that of Connecticut.

E. H.

SPREAD OF THE BOLL WEEVIL.—The *Report* for 1906 of the Agricultural Experiment Stations of the Louisiana State University says that the boll weevil continues to make rapid progress in the invasion of the State. Points near the

Ouachita River have been reached, and by the close of 1907 the pest will be found in all but the easterly parishes of the State. The past season in the heavily-infected area, however, has demonstrated that moderate crops of cotton may be raised in the presence of the boll weevil, if the planter follows an intensive system of cultivation and fertilizes and selects his seed for early maturity:

The people do not feel the apprehension on this subject that they did two years ago. By the best system of agriculture in vogue we may still grow cotton as our principal money crop in the cotton section.

THE ORIGIN OF AMERICAN COLD WAVES.—Professor Cleveland Abbe, of the United States Weather Bureau, in the *Monthly Weather Review*, Vol. XXXIV, 1906, 518-519, gives in brief the three theories which are held regarding the origin of North American cold waves. One theory holds that cold waves are due to upper westerly winds which blow over the Rocky Mountains toward barometric depressions. The descending air, dry and clear, cools by radiation more rapidly than it warms by compression. A second theory holds that cold waves are horizontal protrusions to the south from great areas of cold, lower air in Arctic America. A thin lower stratum of this cold air is drawn southward by a cyclonic area in tropical America, the Gulf States or the West Indies. According to the third theory a cold, upper anti-trade comes from equatorial regions to the Arctic on gentle gradients. Its temperature is so low that when it finally descends to sea-level in latitudes 50°-70° north, the warming by compression does not raise its temperature above the low readings noted in severe cold waves. Professor Abbe adds that possibly all three of these theories must be combined in order to explain the actual conditions.

R. DEC. W.

CHANGE IN THE CLIMATE OF KANSAS.—Professor Willis L. Moore, Chief of the Weather Bureau, recently made certain statements regarding the Great Plains, in which the opinion was expressed that no permanent change in climate has taken place there. In reply to Professor Moore, Dr. F. H. Snow, of the University of Kansas, has issued a brief report, setting forth the results of his own observations, in which he holds the opposite view. Dr. Snow maintains that an increase of rainfall which his observations appear to show during the latter half of a thirty-nine year period, has been brought about by human agency, the effective cause of the change being the planting of trees, the breaking up of the soil, etc. A decrease in wind velocity in recent years, and an increase in relative humidity, are also noted. The change in rainfall and wind velocity has been, according to Dr. Snow, more than 10 per cent.; the increase in relative humidity more than 6 per cent.

It may be noted, in reference to this general question, that the observations to which Dr. Snow refers cover too short a period for any accurate generalization, and that it is the consensus of opinion among climatologists that permanent, progressive climatic changes are not taking place, although it is perfectly clear that slight oscillations, first in one direction and then in another, are occurring.

R. DEC. W.

THE CAPE COD SHIP-CANAL.—After half a century of agitation, the construction of a ship-canal across the western end of Cape Cod is at length assured. The August Belmont syndicate of New York under the name of the Cape Cod Construction Company has been awarded the contract for the entire work of building the canal. The bid of the company, \$11,990,000, covers all the construction, although it is understood that much of the work will be done under sub-contracts.

Wm. B. Parsons is to be chief engineer, and with him is to be associated John B. McDonald, the New York subway contractor. Probably the majority of the unskilled labourers will be Italians, hired in New York. A large number of masons and carpenters as well as other skilled workmen will also have to be brought from a distance, while the local Cape Cod farmers will be relied on for odd jobs and teaming. Unless there should be some unforeseen difficulty, such as delay in coming to an agreement with the New York, New Haven and Hartford Railroad, work will begin in the middle of May. Two years ought to suffice for the rough work of digging and grading; and it is expected that the canal will be ready for use by the spring of 1910. The water-route from Boston to New York will then be only about 260 miles long, instead of 330 as it now is. E. H.

CANADIAN TIDAL AND CURRENT SURVEY.—This Survey, which is attached to the Department of Marine and Fisheries at Ottawa, has just reprinted its first *Report* of progress, which appeared in 1894 and has long been out of print. It explains the lack of information on tides and currents which then existed throughout Canada and was seriously felt by the shipping interest. The purpose in organizing the Survey was to obtain practical information concerning tides and currents for the Atlantic and Pacific coasts of Canada. The Survey now issues Tide Tables regularly, and publishes information on currents, which is widely distributed.

INDIAN TYPES IN THE AMAZON BASIN.—Dr. Theodore Koch-Grünberg's ethnological researches (1903-05) in the region of the upper Rio Negro have been briefly described in the *BULLETIN* (1906, pp. 376-7). This part of the upper Amazon basin was very little known, and the explorer improved the opportunity not only to study the new tribes of Indians he met but also to trace some of the hitherto unknown head waters of the Rio Negro, so that his map is, in part, original material for the cartographers. He has recently issued a series of folio sheets, "Indianertypen aus dem Amazonasgebiet," containing admirable photographic reproductions of the Indian types he met. His publisher, Herr Ernst Wasmuth, of Berlin, has sent to the Society *Lieferung 1*, containing twenty of these plates, which are devoted to Tukano types, excepting four figures on plates 14 and 15, which are Miriti-Tapuyo.

These fine type photographs which Dr. Koch-Grünberg is now publishing are especially welcome, because, while there are rich collections of this kind from most other parts of South America, they were wholly lacking from the region visited by this ethnologist. His entire collection includes about 300 types from nine tribes.

The photographs have been reproduced without any retouching. The sheet usually shows two persons, each in profile and full face. The letterpress gives a description of the physical characteristics of each type pictured, together with a summary account of its geographical environment.

ASIA.

A LETTER FROM DR. SVEN HEDIN.—Further particulars are received in a personal letter from Dr. Sven Hedin to Reuter's correspondent at Calcutta, regarding his remarkable trip across Tibet from north to south. The letter is dated Shigatse, Feb. 22. The explorer says:

The country between the Ngangtsi-tso [tso = Lake] and the Brahmaputra is one of the most interesting portions of Tibet. The plateau stretching to the south, hitherto unknown, is one of the highest

on the earth. The watershed between the Ngantsi-tso and the Brahmaputra is situated further north than has been believed, and the country consists of the most complicated labyrinth of ranges and ramifications of rivers. Big rivers flow from this district to the Brahmaputra. At Shigatse there are large villages with temples and gardens low down on the north side of the river.

From Stanagbo the explorer travelled by boat. The river was full of floating ice, and there was a constant stream of boats with pilgrims on their way to the New Year festivals at Tashi Lumpo [near Shigatse, the largest lamasery in Tibet]. Dr. Sven Hedin met with a very hearty welcome. The Tashi Lama overwhelmed him with kindness, giving him presents of pack animals and provisions and allowing him to sketch and photograph everywhere. He describes the Tashi Lama as a most wonderful and sympathetic man. Dr. Sven Hedin had an interview with him lasting several hours at Labrange. The explorer, at the time of writing, was again starting for unknown regions.

Between Chinese Turkestan and the southern border of Tibet, Dr. Sven Hedin travelled 840 miles in unexplored country, all of which was mapped, points being fixed astronomically and panoramas drawn. A meteorological journal was carefully kept and many photographs were taken. A comprehensive geographical account of the whole journey was drawn up and over 200 specimens of rocks, in connection with geological profiles, were secured.

Before the expedition met the first Tibetans at Bog-chang, Tsangpo, it was suffering from great privation. It had not seen a human footprint for eighty-three days, and the caravan, which had consisted at the start of 122 ponies and mules, had so dwindled that the twenty-five Ladakhi servants had to carry much of the baggage. When the caravan reached Ngangsi-tso only eight ponies and one mule were left, but, fortunately, Dr. Sven Hedin was able to buy twenty-two good yaks from the Tibetans. The explorer, his two assistants, and the Ladakhis, all enjoyed good health in spite of the intense cold and the privations they endured.

BRITISH TRADE WITH PERSIA.—In connection with the report of the British Indian Commercial Mission to south-eastern Persia, commented upon in the February number of the *BULLETIN*, it is interesting to find that a Parsi merchant of India criticises British methods in the same way as does the Mission. Mr. N. M. Parveez, writing in the January number of the *Asiatic Quarterly Review*, states that within the last few years British, including Indian, trade with Persia has declined, while that of Russia has increased 15 or 20 per cent. He attributes this only, in part, to Russia's superior geographical position, and in part to the Englishman's traditional contempt of trade. British consuls in Persia being usually military men, "loathe the name of trade, and look on any one seeking information as a person to be discouraged, because he seeks that which is, as a rule, not available. . . . The Russian consuls are keen and active in promotion of trade." The British banker in Persia, as another traveller states, often spends his afternoons in riding, or playing tennis; while the Russian banker, who is frequently a Finn or an Armenian, sits in the native shops and watches what kind of goods the natives buy most readily, in order to advise his correspondents.

Mr. Parveez points out two hopeful lines of development in Persia. One is found in the rich copper, iron, and other mines in the eastern part of the country; the other lies in the use of the automobile. Profitable railroad construction is almost out of the question because of the scarcity of population. Roads fit for automobiles, on the other hand, can be constructed at comparatively slight expense, in the vast gravel plains and salt deserts of the eastern part of the country.

At present the balance of trade is enormously against Persia. The imports are nearly ten million dollars greater than the exports, which amount to between fifteen and twenty million. This is partly due to the character of the native traders: "They have no idea of the value of time, particularly in relation to the payment of their debts. They are even slower in discharging financial obligations than in making up their minds. Instead of persevering with the sale of a particular class of goods, they alternate between one department of trade and another, and it often happens that they owe for articles they have long since ceased to supply."

According to Mr. Parveez, and to most authorities on Persia, "the greatest of all obstacles to trade advancement lies in the character of the administration, and the conservative prejudice of the priesthood." Back of this, however, appears to lie the fact that the physical condition of Persia has been deteriorating for centuries. Slight failures of rainfall have caused repeated famines and untold misery. The people have more and more grown "poor, lazy and feckless, though they are distinctly intelligent;" nothing has been introduced to counteract the effect of adverse physical environment, and hence, it would seem, has come universal corruption, both in office and out; and naturally trade cannot flourish. E. H.

LEADING PORT OF THE PERSIAN GULF.—Bander Abbas is perhaps the best and most conveniently situated port on the Gulf, with the exception of Ahwaz, over which it has the advantage of a shorter sea lead. It is the natural southern entrance for and outlet of the trade, not only of south-east Persia, but of the whole of the immense tract of country lying between Herat and Yezd, Meshed, and Bampur. The Persian Government has made little effort to secure the proper development of the port and district. There is a fairly good roadstead, which might be made into a really good harbour by dredging and building a mole. On the other hand, Bushire, far up the east coast, has no harbour, and its two roadsteads are of such a character that vessels of any tonnage have to anchor a long way out.

Unfortunately, the roads leading from Bander Abbas to the various trade centres in the interior are not safe, but this is true also on the Bushire-Yezd routes. The development of the great region of which the port of Bander Abbas is the mouth and the improvement of the port will mean great things for Persia, for they will bring wealth to the Shah and his subjects.—(*Report on the British Indian Commercial Mission to S. E. Persia during 1904-1905.*)

THE NEW ERA IN CHINA.—Lieut.-Col. Wingate continues the account of his nine years' survey and exploration in northern and central China in the March number of the *Geographical Journal*. He found that in the ancient city of Lü-chou and also in Ngan-ching, the capital of Ngan-hui, rapid progress is being made in education along modern lines. Splendid schools and hospitals are in operation, and the thirst for Western knowledge is apparent on every hand. The inhabitants of southern Ngan-hui, especially, are anxious for all modern and Western improvements. In northern China most of the inhabitants desire railroads, mines, and every kind of occidental invention and improvement. Lieut.-Col. Wingate found many Chinese in the interior anxious for the extension of the railroad, the telegraph, and the post office to their towns and villages. He believes, however, that many Chinese are too confident of their ability to accomplish great things unaided.

ORIGIN OF AGRICULTURE AND OF SETTLED SOCIETY IN CENTRAL ASIAN OASES.—With the gradual shrinking in dimensions of habitable areas and the disappear-

ance of herds of wild animals, man, concentrating on the oases and forced to conquer new means of support, began to utilize the native plants, and from these he learned the use of seeds of different grasses growing in the dry land and in the marshes at the mouths of larger streams on the desert. With the increase of population and its necessities, he learned to plant the seeds, thus making, by conscious or unconscious selection, the first step in the evolution of the whole series of cereals.

For a long time the rainfall was doubtless sufficient to ripen grains, as it still is in some of the valleys of Ferghana, and in some years even at Samarkand. Later, experience taught the need, and some simple method, of artificial watering, and in this acquisition lay the germ of agriculture and of the conquest of the arid regions of the globe.

In Asia it rendered possible the civilizations of Elam and Mesopotamia. All the really great prehistoric cultures were developed in arid regions—all of those of which we have knowledge, and perhaps others of which we have not yet found the remains, in Mongolia, Arabia, and the Sahara; while in America we have an instance in Peru. The fertile loess on the semi-arid borders of such regions and the equally generous soil of the delta oasis were the foundation on which the independent cultures of village communities were built up. Only later, when the knowledge thus obtained could be applied to the utilization of great rivers in turning wide deserts into gardens, was it possible to render populous great countries under the centralized power that constituted empire. This stage was never fully reached in central Asia and northern Persia. The countless isolated oases, even under Chaldean, Persian, and Arab dominion, never advanced really much more than nominally beyond the feudal stage. . . .

Shut off from the periphery of Asia and from the other continents while still in a low state of savagery, we see man gradually broken up into smaller groups, which are forced into isolation on, in the main, continually diminishing habitable oases; and we see on these the growth of differentiated, but fundamentally related, cultures. Lastly, and most important of all to us, we see here man under the spur of necessity, the relentless goddess of evolution, building in village communities, in agriculture and in the essential industries the foundation of civilizations, to the reaction of which upon cultures evolved in the oases of the Sahara, and on the Nile, and in Mesopotamia we owe the framework of modern Western civilization.—(*From Presidential Address by Dr. R. Pumpelly, read before the Geol. Soc. of Amer., Dec. 27, 1906.*)

EUROPE.

SUICIDE IN GERMANY.—Since 1899 the *Vierteljahrshefte des Deutschen Reichs* has published the statistics of suicide in the empire, and from 1893 to 1898 inclusive, they were recorded in the *Statistisches Jahrbuch*. The first number of the *Vierteljahrshefte* for 1907 collates the total statistics for the eleven years, 1895-1905, and prints comparative statistics by states and provinces for 1902-1905 inclusive. There is little variation in the total number of suicides from year to year, excepting that the number is gradually increasing, and this is obviously due, for the most part, to the growth of population. The total number of cases in 1895 was 10,510, of which 8,285 were men and 2,225 were women. In 1905 the number was 12,810, of which 9,913 were men and 2,897 were women. The number of suicides in every 100,000 of the population in 1895 was 20.2; and in 1905, 21.3. In 1905 the number of suicides in comparison with the total popula-

tion was least in the province of Posen, in Hohenzollern, and in Alsace-Lorraine, where there were 8.8, 11.8, and 11.9 suicides respectively for every 100,000 inhabitants. The lowest figures of self-destruction were, in the west in Rhineland and Westphalia, in the south in Bavaria, and in the east in the provinces of West and East Prussia.

JAPANESE IN GERMANY.—*Ost-Asien*, published in Berlin monthly, represents the Japanese interests in Germany. It contains news of the Japanese colony and articles of special interest to these sojourners in Europe. Among the contents of the February number, for example, is a group photograph of the thirty-two Japanese living in Munich and five pages of the names and addresses of Japanese and Chinese in Berlin and its suburbs, of Japanese in other parts of Germany and of the most prominent among them in other countries of Europe. The visit of the German Emperor to the Japanese Embassy in Berlin is described. Among the leading articles is one on the relations of England and Germany respectively with Japan. A large part of the journal is devoted to news items, including many from Japan.

THE ABNORMAL WEATHER OF THE SUMMER OF 1906 IN ENGLAND.—The *Quarterly Journal of the Royal Meteorological Society*, Vol. XXXIII, No. 141, 1907, contains a discussion by William Marriott, of the "Abnormal Weather of the Past Summer and some of its Effects." Owing to the great heat, vegetable matter became very inflammable, and consequently there were more brush and heather fires than usual. With the advent of the hot weather the death-rate increased considerably, the rate at once beginning to rise when the mean maximum temperature for the week reached 72°. The increase in the death-rate was due almost wholly to the mortality among infants under one year of age, the prevalence of epidemic infantile diarrhœa being the specific cause of these deaths. Milk soured, and became a source of danger to children. An extensive use of canned foods—the usual accompaniment, it may be remarked, of a period of drought when green food is scarce and expensive—tended to produce ptomaine poisoning and diarrhœa. There was a deficiency of grass for cattle, and the milk supply fell off 30 per cent. The brilliant sunshine and warm weather stimulated holiday travel. More visitors than usual went to the various seaside and holiday resorts, and outdoor entertainments were carried on without interruption.

For a study of the effects of a period of drought and high temperatures in this country, reference may be made to a paper by R. DeC. Ward, "Some Economic Aspects of the Heat and Drought of July, 1901, in the United States," *BULLETIN OF THE AMERICAN GEOGRAPHICAL SOCIETY*, Vol. XXXIII, 1901, 338-347.

R. DeC. W.

SURVEY OF THE SCOTTISH LAKES.—The *BULLETIN* has, from time to time, called attention to the bathymetrical survey of the fresh-water lochs of Scotland, under the direction of Sir John Murray and Mr. Laurence Pullar. During the past four years the survey of 554 of these lochs has been completed, which practically means the end of the survey, except of some small lochs on which no boats could be found. About forty voluntary and paid assistants have been employed during the course of the work, in addition to many boatmen and other workmen. Up to the present time the charts of 180 lochs, beautifully produced by Bartholomew, with descriptive text, have been published in *The Geographical Journal* and the *Scottish Geographical Magazine*. The *Journal* says that arrangements have been made for the publication in its pages during the present year of the descriptions

and charts of the thirty-three lochs in the Ness Basin. This will complete the publication of the observations made in the more important lochs. The results obtained in the case of the remaining 341 lochs will be published as a special volume by the Royal Geographical Society sometime in 1908. Mr. J. G. Bartholomew is now producing the charts for this volume.

SPANISH CARTOGRAPHY IN THE MIDDLE AGES.—The idea seems to be quite prevalent that science, and especially Geography and (as then called) Cosmography, was cultivated in Spain and even introduced into Spain by the Arabs. That the Spanish Moors gave the world several very remarkable geographers and cosmographers is indisputable. We have but to recall the illustrious names of Al Rasis and Edrisi. With the thirteenth century Arabic culture began to decline in Spain, but that decline was not, as sometimes believed, followed by a relapse into ignorance of the Christian Spaniards. On the contrary, at the time when Abulfeda wrote his Description of Spain (mostly copied from Abensaid, who, in turn, copied from Aben-Abdel-Birr), Alfonso X called together the celebrated Astronomical Congress at Toledo in 1252, as a result of which appear the astronomical tables bearing his name, and he wrote himself the ponderous "*Libro del Sabér*," a compendium of the knowledge of the period, particularly in astronomy and geography. Arab and Jewish men of science attended that Congress also; but anterior to 714 Spain had already its native cosmographers and a specifically Spanish school (as it might be called) of geography and cartography took its origin from Orosius and Saint Isidore. Both are anterior to any Arabic influence. Saint Beatus continued in the same line, and thus, during centuries when the Spanish Christians were most sorely pressed by the Mohammedans, the cultivation of geography and cartography was carried on entirely independent of Moorish influence. In the Boletín of the Madrid Geographical Society, Vol. XLVIII, Señor Antonio Blázquez makes it clear that the system followed by the Arabs is distinct from that observed by their Roman or Gothic predecessors on Spanish soil, and that, while the Arabic execution of maps is more graceful and artistic, the other is superior in endeavours to attain correctness.

The author traces and establishes this continuation of Christian Spanish work in cartography independent from the Arabs through the duration of Moorish preponderance. He also calls attention to another important point—the lack of nautical charts in Arab maps and atlases. These appear in the twelfth century as the work of Catalonians. The credit of these early charts has been claimed for Italy, but it is evident now that they are of Spanish origin. The imperfect manner in which the western portions of the Iberian peninsula, and especially the Atlantic coast, are represented in Moorish and Italian maps, and the lack of data concerning these regions in the geographic literature of Italy and of the Arabs, with the explicit confession, from the time, that neither of these peoples navigated beyond Gibraltar or even reached it, leave no room for doubt. Interesting data are given on the extent of Spanish navigation and commerce in the eleventh, twelfth, and thirteenth centuries. It extended to England at a time when Italian products were hardly known there. Important is, in this respect, the catalogue of Spanish produce and manufactures imported into Flanders in the thirteenth century. The parts of Iberia from which the importations came are specified, and we find enumerated the "kingdoms" of Navarra, Arragon, Castilla, Leon, Andalusia, Granada, Galicia, Portugal, and Majorca.

After the fourteenth century Italian commerce began gradually to supersede the Spanish, and Italian maps and charts became more prominent. But naviga-

tion of the Atlantic and along the African coast remained Spanish and Portuguese. As to the Moors, they never sailed even to the Straits of Gibraltar. The pretended voyages of the Almagrurín and Arab discoveries of the Azores or Canaries must be relegated to the domain of fiction. There is no better proof of it than the Moorish maps and geographic descriptions of the Middle Ages.

On the whole, the monograph by Sr. Blázquez deserves careful attention. It brings to our notice cartographic material hardly known to the public, and assigns the proper dates to much of it. Without in the least becoming offensive, the author establishes the credit due to his country for early achievements claimed, sometimes, by other nations, and in this he only performs his duty.

The accompanying plates are mostly outline copies of the oldest maps and charts, illustrative of the text. They are, of course, in reduced proportions, and in black; hence cannot, and do not, pretend to give an idea of the artistic value of the originals.

A. F. B.

OCEANIA.

THE ERUPTION OF MATAVANU IN SAVAI.—The German colonial administration in Samoa sent to Professor K. Sapper of Tübingen a large number of specimens, photographs, and newspaper and other reports, from which he compiled the fullest account that has yet been written of the remarkable volcanic eruption that, in September last, had been in progress for more than a year in the island of Savaii, Samoa. His paper appears in the *Zeitschrift* (No. 10, 1906) of the Berlin Geographical Society. For more than a century the volcanoes of this island had been inactive. Then, in 1902, two minor outbreaks occurred, and a greater eruption began in 1905, which caused much anxiety and alarm. A series of earthquakes between July 25 and Aug. 1, 1905, ushered in the eruption. On the evening of the latter date a loud explosion occurred, and what were called "pillars of fire" were seen issuing from the Matavanu valley, some seven and a half miles from the coast on the northeast side of the island.

This first eruption, though of an explosive nature, was not very violent, as the eruptive material, according to estimates, was not thrown to a height of more than 200 meters, and the hill it formed was not more than 150 meters high. The next phenomenon observed was the flowing of lava on Aug. 9, at first in small quantities and then more abundantly until Dec. 6, when it reached the coast. The flow of lava streams to the sea continued at intervals to the end of September, 1906. Prof. Sapper had received no later reports. In the ten months following the time when the lava first reached the coast, the outflow of lava appears to have been continuous, though varying in amount. It was not accompanied by any high degree of explosive activity.

Dr. Grevel with a party visited the volcano on April 23, 1906, and wrote an interesting account for a local newspaper. The party made the ascent over the crust of the lava stream, which was smooth and easily traversed. The crust was sufficiently cool for the barefooted Samoans to walk upon it without discomfort. At intervals, the solid surface of the lava stream was broken by vent holes. One of these near the crater was at first mistaken for a parasitic cone, as the crust of the lava rose gently to the vent, which was much smaller in diameter than the cavity underneath. The vapours were too thick and sulphurous to permit any sight into this cavity. Large stones were thrown in, but they gave no clue to its depth, as their fall was unheard. Four of these vent holes were examined, each repeating the features of the first on a smaller scale.

The party then climbed to the crater by an easy ascent over the lava flow on the northern side. No view of the crater could be obtained from this point owing to the drift of the south-east trade wind; so the party worked around to the east, where the surface was covered with countless moths, that had been attracted by the crater glow and were killed by vapours rising from cracks in the lava. These vapours had also proved fatal to a flying fox, a dove, and a sea-gull. Finally they moved around to the southern side of the crater, where a good view of it was obtained. It was about 300 meters in diameter. A lake of molten lava, in gentle ebullition caused by rising steam bubbles, filled the crater. While they were there, a gentle flowing of this lava to the north began and the movement of the stream became more rapid, until the lava disappeared in a cataract amid a cloud of steam and probably joined the lava flow over the surface of which the party had ascended.

When the lava reached the sea it flowed out to the coral reef, where its end, being cooled by the surf, formed a wall between which and the coast the lava flowed quietly along the lagoon. The sea was in violent ebullition, dense clouds of steam were rising, and for over 300 feet from the end of the lava flow the surrounding salt waters were boiling hot, and many fish, killed and cooked in this cauldron, were collected and eaten by the natives.

Here and there the lava flowed over the reef into the deep water outside. Wherever this occurred, violent geyser-like explosions marked the progress of the stream. These explosions were due to steam forming under the still liquid lava. The lava was remarkable for its fluidity, and issued in great quantity. The area on the island covered by it extends about 6 kilometers to the west and 12 kilometers to the northeast of the volcano, and has a width of from two to five kilometers. It has filled the lagoon for about eight kilometers along the coast, destroying several villages and rendering others uninhabitable by cutting off their water supply. A number of small promontories of lava were thrust forward beyond the reef.

POLAR.

BELGIAN ANTARCTIC EXPEDITION.—Mr. Henryk Arctowski, the meteorologist of the *Belgica* Antarctic expedition, is now planning to conduct the next Belgian expedition in south polar waters. A committee has been formed at Antwerp for the advancement of his project, and the choice of a vessel for the party is now being considered. According to a report forwarded by Consul-General Diederich to Washington, Mr. Arctowski has explained his plan to the Antwerp Committee as follows:

My intention is to begin the work of exploration of the antarctic regions at the spot where the *Belgica* (the Belgian vessel which took out the first antarctic expedition under de Gerlache) came out of the ice in 1899, *i. e.*, from 109° longitude west to 160° longitude west, where Edward VII. Land is located. At this point there is a vast unexplored territory which the second Belgian antarctic expedition must cover in order to follow up and complete the discoveries made by Commander de Gerlache on board the *Belgica*. A little to the south of Edward VII. Land and toward the west is the face of the Great Ice Barrier discovered by Ross. It is from this point that the journey toward the south pole can be started with the greatest chance of success.

There is an immense area of flat glacier ice upon which I should like to use one or two automobiles for journeying toward the south, not in the vain hope of reaching the pole, but for the purpose of tracing the prolongation of Edward VII. Land, and to see if this prolongation extends to Victoria Land, situated about 20° farther west. In this case there must be an immense gulf separating Victoria Land from Edward VII. Land. If, however, the coasts are prolonged without joining, there must exist a wide arm of the sea separating the antarctic zone into two hemispheres.

DR. CHARCOT'S NEW EXPEDITION.—We have received from Dr. Charcot a brief statement of his plans for a new expedition to the Antarctic for the purpose of continuing his researches in the Graham Land region. At the explorer's request, a committee was lately appointed by the Academy of Sciences to consider the question, and, as a result of its favourable report, the Academy, on Feb. 4, decided to support his proposals for a second French Antarctic expedition. The following is an outline of the provisional programme:

A vessel will be specially built for the purposes of the expedition, possibly at Dr. Charcot's own expense. The explorer and his companions would proceed in the spring to the site of the rich deposits of fossils discovered by the Swedish expedition at Mount Bransfield and Seymour Island, and, having either returned to Ushuaia (Tierra del Fuego) with the collections or left them at an accessible spot in the region to the south, would, from Wandel Island as a base, extend the explorations carried out during the first expedition to the unknown region south of Loubet Land. The expedition would winter at a suitable spot, making journeys along the coast and into the interior, with a view both to scientific observations and a general reconnaissance of the region to the south. During the following summer the voyage would be resumed according as circumstances dictated. Scientific work of all kinds would be kept up throughout the course of the expedition. Dr. Charcot calculates the probable expense, including the cost of the ship, at not over £30,000.—(*The Geog. Jour.*, Apr. 1907.)

VARIOUS.

THE METEOROLOGICAL BUREAU OF SAO PAULO, Brazil, is a part of the Geographical and Geological Department. *Bulletin* No. 20 gives in much detail the Meteorological data for the months of June, July, and August last year, with a climatological map for each month.

THE GEOLOGICAL DEPARTMENT OF HARVARD UNIVERSITY has received funds for the erection of a seismograph in the University Museum. The instrument will be a Bash-Omori seismograph, with two conical pendulums, one swung in the meridian and the other east and west. The Harvard station will pay particular attention to New England earthquakes and to the geological examination of the recent fault lines along which it is believed that many historically-recorded small shocks have arisen.

THE U. S. GEOLOGICAL SURVEY has prepared a topographical and geological model of Alaska for the Jamestown Exposition. The horizontal scale is about forty miles to an inch, and there is a five-fold exaggeration of the vertical scale. The relief forms and the distribution of economic deposits are shown and also the character and slope of the neighbouring sea-floor.

THE SUDAN PIONIER (1907, No. 3) prints the latest statistics of the Mohammedan population of the world as compiled by Dr. Zwemer. The total number of Mohammedans, according to this traveller and writer on Islam, is 233,000,000, of whom 169,000,000 live in Asia, 59,000,000 in Africa, and 5,000,000 in Europe. The total number living in regions under Christian Governments is 161,000,000. The distribution of Mohammedans according to the languages they speak, is: Indian languages, 63,000,000; Chinese, 31,000,000; African, 32,000,000; Mongolian, 30,000,000; Slavonic, 8,000,000; Persian, 9,000,000; Turkish, 15,000,000; Arabic, 45,000,000. The total number of Mohammedans, among whom no evange-

lical mission has been established, is over 68,000,000, or almost a third of the Mohammedan world.

AMERICAN GEOGRAPHICAL SOCIETY.—A Regular Meeting was held at Mendelssohn Hall, No. 119 West Fortieth Street, on Tuesday, April 23d, 1907, at 8.30 o'clock, P. M.

Vice-President Tiffany in the chair. The following person, recommended by the Council, was elected to Fellowship:

Henry Wellington Wack.

The Chairman then introduced Dr. S. M. Zwemer, who addressed the Society on Eastern Arabia.

Stereopticon views were shown.

On motion, the Society adjourned.

NEW MAPS.

AFRICA.

GOLD COAST.—Northern Territories. (Part of sheet 60.) Scale, 1:1,000,000, or 15.8 statute miles to an inch. Compiled in the Topographical Section, General Staff. Edward Stanford, Agent, London, 1906. (Price, 2s.)

A well-produced map of the Northern Territories of the Gold Coast Colony between Senegal on the north, Ashanti on the south, Togo on the east, and the Ivory Coast on the west. Boundaries are in red, place names and routes in black, water and hydrographic nomenclature in blue, and topography in brown. A great number of routes, villages and hills are shown, but, with the exception of the international boundary surveys, no part of the region has been accurately surveyed. The positions of rivers, villages and hills are therefore only approximate. This is a sheet of the excellent map of Africa on a scale of 1:1,000,000 that Great Britain is producing, which will be of great value for many purposes until it is supplanted by complete surveys.

GAMBIA.—Gambia. Reproduced from the work of the Anglo-French Boundary Commission, 1904-1905. (Two sheets.) Scale, 1:250,000, or 3.95 statute miles to an inch. Compiled in the Topographical Section, General Staff. Edward Stanford, Agent, London, 1906. (Price, 2s.)

The international boundary and the position of the boundary pillars, many of which were planted at intervals of about two miles, are shown. The scale permits the introduction of a large amount of cultural information, such as native paths, all the huts in small villages, rice and other farms, besides forest and swampy areas, etc.

SAHARA.—Progrès de la Pénétration Saharienne—1830-1906. In "La Pénétration Saharienne (1830-1906)," by Prof. Augustin Bernard and N. Lacroix. Algerian Government, Algiers, 1906.

The monograph which this sheet illustrates is an instructive account of the history of exploration in the regions of Algiers and Tunis and the Sahara to the south of